United States Department of the Interior
Bureau of Land Management

Bloomington Cave Management Plan

Washington County, Utah.

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BLM

Bloomington Cave Management Plan

This plan is in conformance with management decisions from the *St. George Field Office Record of Decision and Resource Management Plan*, approved in March 1999 and consistent with applicable federal legislation, including the *Federal Cave Resources Protection Act* of 1988, federal regulations, and BLM policies. It will become effective when signed and may be updated or amended, as needed.

Prepared by: _____ 2009
Assistant Field Office Manager, St. George F.O. Date

Approved by: _____ 2009
Field Office Manager, St. George Field Office Date

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MANAGEMENT SUMMARY

The Bloomington Cave Management Plan (Management Plan) has been developed by the St. George Field Office of the Bureau of Land Management (BLM) to enhance resource protection for the sensitive biological, geological, and cultural/historical values of the cave; to improve visitor preparedness when exploring the cave; and to provide opportunities for high quality recreational and educational experiences at Bloomington Cave. This cave has been listed as a significant cave on federal lands, under the authority of the *Federal Cave Resources Protection Act*, and is managed in conformance with this legislation and other applicable federal laws, as well as management direction from the *St. George Field Office Record of Decision and Resource Management Plan* (1999).

The Management Plan presents the long term management objectives for Bloomington Cave and identifies management actions needed to meet those objectives and resolve or reduce resource use conflicts. Management actions proposed to be implemented include installation of cave gates, implementation of a visitor use permit system, the development of new visitor public education materials; systematic inventories of cave resources; restoration of damaged habitat; and monitoring of cave conditions and the quality of visitor recreational experiences.

CHAPTER 1- INTRODUCTION

Need for a Management Plan

A management plan is needed for Bloomington Cave to protect and preserve cave resource values, improve the quality and safety of visitor experiences, and enhance the scientific and educational potential of this cave. Over the past decades, fragile and unique geological formations in Bloomington Cave have been damaged or illegally removed and habitats for bats and other species have been impacted by unmanaged visitor uses. The quality of the visitor's recreational experience in the cave has been degraded by graffiti and spray paint along the cave passages and litter strewn throughout the cave. Increasingly, visitor safety has become a serious concern. Many visitors to Bloomington Cave explore its maze of passages without adequate safety equipment and with little understanding of the hazards associated with caving. Serious injuries from falls have required emergency rescues and a fatality occurred in Bloomington Cave in 2002. The Bloomington Cave Management Plan (Plan) proposes objectives for long-term management and identifies actions to protect cave resources, improve visitor preparedness for cave exploration, and provide higher quality visitor experiences in this cave.

Legal Authorities

Among the federal laws that apply to the management of public lands, the following are particularly relevant to the management of Bloomington Cave: The *Federal Land Policy and Management Act* of 1976 (P.L. 94-579) at Sec.102 (a) 8 directs BLM to manage public lands in a manner

> *that will protect the quality of the scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values;*

The *Federal Cave Resources Protection Act* of 1988 (FCRPA-16 U.S.C. 4301-4309) requires federal agencies to

> *secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people…*

This legislation further authorizes federal agencies to take such actions as may be necessary to further the purposes of FCRPA, including the regulation or restriction of use of significant caves.

FCRPA also directs the Secretary of the Interior to prepare and maintain a listing of significant caves on public lands. The *Code of Federal Regulations* at 43CFR, Part 37.11 (c) lists the six criteria that are used to evaluate cave significance. The St. George Field Office (SGFO) evaluated Bloomington Cave and determined that it satisfied two of the six criteria of significance (43 CFR, Part37.11 (c). It was significant for its biological resources (Biota) as the cave provides seasonal or yearlong habitat for species that are listed as sensitive by Federal and State agencies. Bloomington Cave was also significant for its recreation potential (Recreation), under a significance criterion that addresses this public use. The SGFO nominated Bloomington Cave to be listed as a significant cave and it was so listed in 1994.

Consistent with its listing as a significant cave, Bloomington Cave was identified for specific management direction through SGFO's land use planning process that resulted in the approval of a Resource Management Plan (RMP) for public lands in Washington County in March, 1999. Additional information on management direction from the RMP is described in the following section.

Conformance with BLM Land Use Plan

Management decisions for public lands in Washington County are derived from the *St. George Field Office Record of Decision and Resource Management Plan (RMP 1999).* Bloomington Cave is specially identified in a management decision that states

> *Bloomington Cave will be monitored periodically and appropriate guidelines implemented to provide for visitor safety and the protection of cave resources* (RMP 1999, Decision RC-17 c).

The development and implementation of a cave management plan that addresses cave resource protection and visitor safety would be in conformance with this management decision from the RMP and would not conflict with other resource goals and decisions contained in the RMP.

Location and Environmental Setting

Bloomington Cave is located on public lands in the Beaver Dam Mountains of Washington County, Utah, approximately 15 miles west of the City of St. George (**Figure 1**). The Beaver Dam Mountains are located within the Beaver Dam Range physiographic subdivision of Utah, where elevations range from approximately 2,000 to 4,500 feet above mean sea level.

The regional climate is characterized by low precipitation and humidity, with hot summers and cool winters. Average rainfall is approximately 7 inches per year, a majority of which falls during late summer monsoonal showers and during the winter months. This portion of Washington County is within a transition zone between three eco-systems: the Mojave Desert, the Great Basin, and the Colorado Plateau. As a result, plants and animals from each of the eco-systems co-occur here. Plants in the general area of Bloomington Cave are those of the Blackbrush Community of the Mojave Desert eco-system and well adapted to shallow soils and scant water. Blackbrush (*Coleogyne ramosissima*), Mormon tea (*Ephedra* spp.) are the predominant species that occur near Bloomington Cave.

The area immediately surrounding Bloomington Cave supports low densities of mammals, birds, and reptiles that are typically associated with a Blackbrush Community. Rodents and small mammals include desert wood rats (*Neotoma lepida*), antelope ground squirrels (*Ammospermophilus leucurus*), kangaroo rats (*Dipodomys* spp.), and blacktailed jackrabbits (*Lepus californicus*). Coyotes (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargegenteu*s), and muledeer (*Odocoileus hemionus*) are the larger mammals that may be present near Bloomington Cave. At least one bat species, Townsend's big-eared bat (*Plecotus townsendii*), uses Bloomington Cave and others, such as fringed myotis (*Myotis thasandoes*), have the potential to be present. Commonly observed avian species are Gambel's quail (*Lophortyx gambelii*) and mourning dove (*Zenaida macroura*), and common ravens (*Corvus corax*). Ferruginous hawks (*Buteo regalis*), short-eared owls (*Asio flammeus*), bald eagles (*Haliaeetus leucocephlus*) and California condors (*Gymnogyps californicus*) may also utilize hunt and forage in the area. Reptiles observed near the cave include side-blotched lizards (*Uta stansuriana*), Western whiptail (*Cnemidophorus tigris*), and sidewinders (*Crotalus cerastes*). .

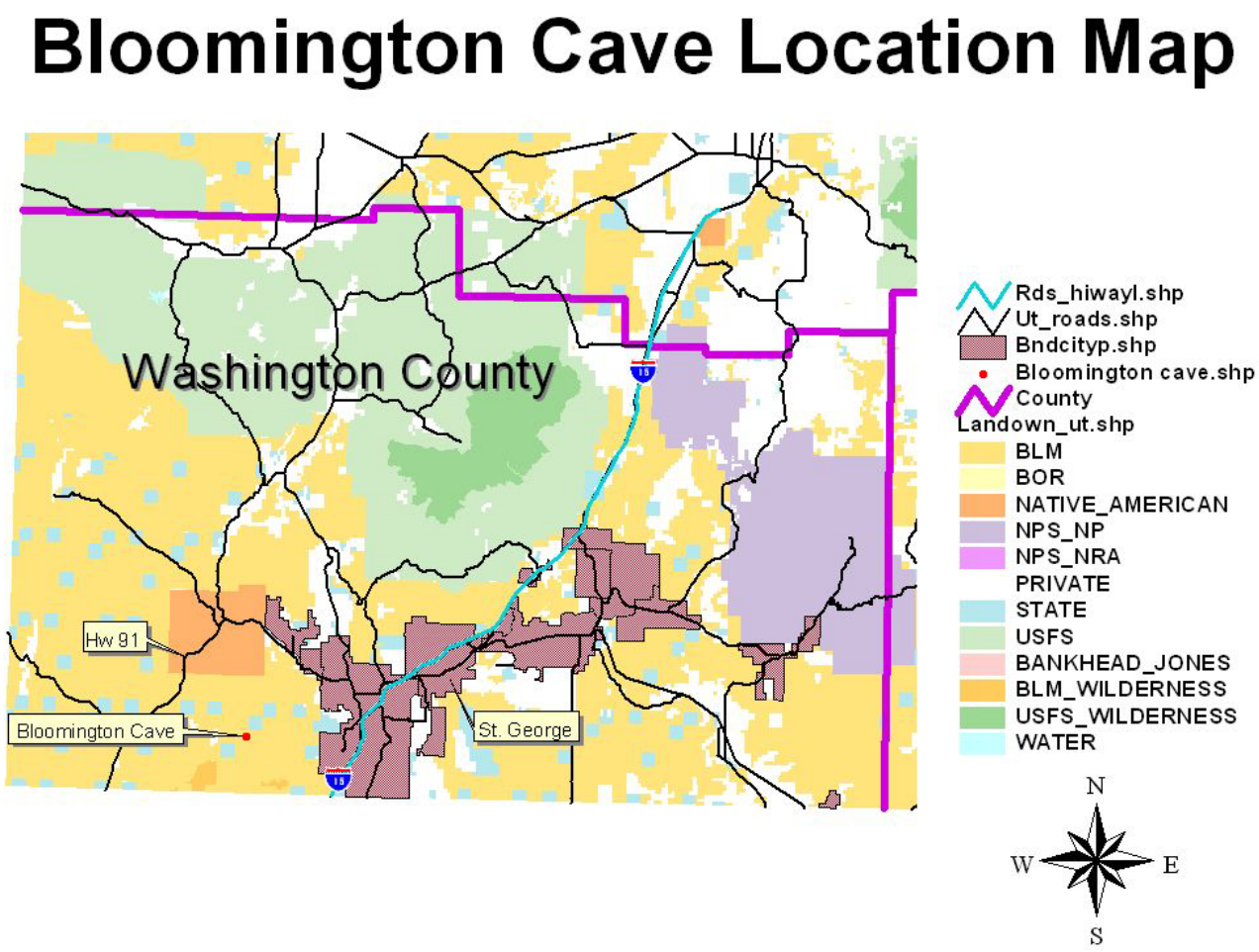

Figure 1- Map Showing Location of Bloomington Cave, in Washington County, Utah

No perennial water sources are found in the immediate vicinity of Bloomington Cave. Small amounts of water percolate into the cave during heavy rain events.

Description of Bloomington Cave

Bloomington Cave is a large tectonic cave, formed along a 60 degree west-dipping fault in the Fossil Member of the Kaibab Formation, a Permian age limestone. It trends nearly north-south following the fault line, with 240 foot depth. The surveyed length of the cave is currently 1.35 miles (7,136 feet), making it the sixth longest cave in Utah. An additional half mile or more of known cave passage remains to be mapped, so the current length is not representative of the entire resource. Small entrances on the north and south ends of the cave provide access to the cave.

The cave has at least six distinctive levels and a maze of passages that are generally narrow, often with steeply dipping floors. In this maze, and in the total darkness of the cave's interior, it is very easy for a visitor to become disoriented. For nearly a hundred years, visitors have marked their routes through the passages, using string, charcoal, chalk, and, more recently, spray paint and the fluorescent contents of "Glo-Sticks". A small number of larger areas or "rooms" are found along the

passages, including areas labeled by cave enthusiasts as the "Big Room" and "the Sandbox" (**Figure 2**). The Big Room has a ledge, known as the "Boardwalk", behind which is a high-angle drop of approximately 150 feet. Many visitors have been seriously injured in falls climbing the high angle slope to the floor of the Big Room and a fatality occurred there in 2002. In several instances, emergency Search and Rescue (SAR) teams have been called in to extract injured visitors from the cave.

Current Conditions:
Bloomington Cave has been impacted by more than a century of unmanaged and often inappropriate visitor uses. In the mid-1970s, graffiti and litter were already noticeable in the 600 feet of cave passage that had been mapped at that time (Middaugh, 1976, unpublished staff report on file, St. George Field Office). Other areas of the cave were in good or pristine condition at that time, with little evidence of human impacts.

By 2003, conditions in Bloomington Cave had markedly deteriorated: a majority of the more than 7,000 feet of mapped cave passage showed damage created by recreational uses. Miles of string had been left by visitors, attempting to mark routes through the cave. Charcoal, and chalk route markings and graffiti marred the entrances and covered the walls of all the main passages and rooms, including the Big Room, and the Sandbox. Increasingly, spray paint and the florescent contents of "Glo-Sticks" were being used to mark routes and add graffiti. The remains of campfires, trash, and human waste were present throughout much of the cave.

Between January and April of 2005, 50 volunteers from many regional cave groups (aka "grottos") donated more than 1,000 hours of time and equipment to assist BLM cave specialists to sandblast spray paint, route markings and graffiti from the walls of Bloomington Cave (**Figure 3**). They also cleaned up string and other litter, ultimately restoring approximately 600 feet of passage in Bloomington Cave. Within months of that widely-publicized volunteer cleanup project (cf., *The Spectrum*, Feb.6, 2005; *Utah Caver Annual*, 2005), new spray-paint and graffiti had re-appeared in the cave and "Glo-Sticks" had been used on the walls in previously undamaged side passages

Cave Resources and Current Conditions

Biological Resources
No systematic inventories of cave life in Bloomington Cave have yet been conducted nor has population data on any species been regularly collected. The cave is known to support a variety of invertebrates, including beetles, crickets, spiders, and millipedes, some of which may be previously unknown species. Reptiles, such as sidewinders and several of the more common Mojave Desert lizards, often seek shelter within the cave. Packrats, kangaroo rats, and ground squirrels, as well as Townsend's big-eared bats, have also been observed in the cave. Townsend's big-eared bats are considered to be a species at risk by BLM and the State of Utah, because of declining populations and habitat loss. Fringed myotis bats, that have some potential to be using Bloomington Cave, are also a BLM and State-listed species at risk.

Current Conditions:
The numbers of bats that seasonally were observed in Bloomington Cave are suspected to have declined in recent years. On November 28, 1952, members of the Southern California Grotto who were exploring Bloomington Cave reported seeing more than 200 bats in a single flight in the cave.

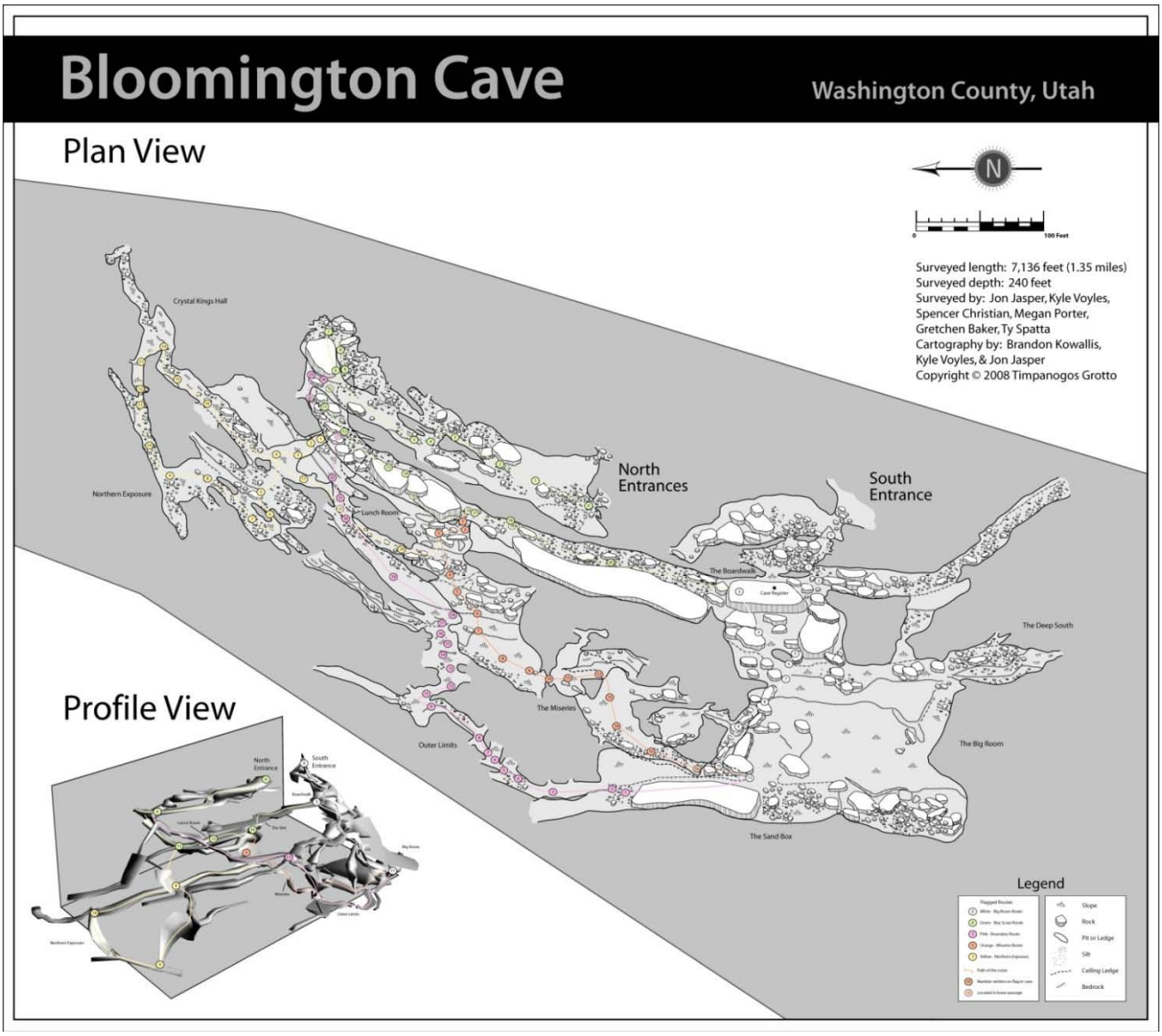

Figure 2 Map of Bloomington Cave

Figure 3 -View of 2005 Graffiti Removal Project. Kyle Voyles, BLM Cave Specialist is shown using sandblasting equipment on spray paint.

Today, relatively few bats are observed in Bloomington Cave. As many bat species, particularly Townsend's big-eared bats, are particularly sensitive to habitat disturbances, it is likely that the large groups of visitors and inappropriate visitor activities, such as campfires and spray painting, have forced at least some of these bats to abandon this cave.

Geological Formations

In 1976, BLM noted sufficient geological formations in Bloomington Cave to warrant considering the cave to "decorated" (having interesting geological formations), despite the fact that it is a tectonic cave. Spelothems were noted, such as stalactites, stalagmites, soda straws, and "bacon rind", all secondary deposition formations. The soda straws were described as fragile, some with interesting shapes. Small and fragile gypsum formations were present and fluting noted in the layers of gypsum (Middaugh, 1976).

Current Conditions:

Since 1976, some of the gypsum formations that were once present in Bloomington Cave have been removed by visitors. Other formations have been heavily damaged by spray painting, graffiti, and smoke from campfires.

Cultural/Historical Resources

No systematic archeological inventories of Bloomington Cave have yet been conducted. Prehistoric archeological materials and human remains are not known to be present in Bloomington Cave (c.f., unpublished report of Southern California Grotto Expedition, Nov. 28, 1952, on file SGFO). As the cave has not been fully inventoried or fully mapped, there

is the potential for such materials to be identified in the future.

The cave walls have been inscribed and painted with names and dates, beginning in late 19th century. None of the early inscriptions have been documented by professional archeologists nor has the significance of these resources been evaluated. Many of the names and dates were placed there by local residents. These examples of early 20th century "graffiti" do provide useful information about past visitation to Bloomington Cave and may be useful "teaching tools" about appropriate (and inappropriate) cave etiquette.

The Paiute Indian Tribe of Utah, including the Shivwits Band and its other respective Bands; the Kaibab Paiute Tribe; Hopi Tribe, Zuni Tribe, and Navajo Nation are among the Tribes that claim cultural affiliation to this region and for whom caves are often identified as sacred sites.

Current Conditions:
Graffiti, spray-painting, and vandalism have impacted the integrity of some of the earlier names and dates, especially those along the main routes of the cave.

Visitor Uses [Recreation]
Bloomington Cave has been visited by the public and cave enthusiasts for well over a century. It has also long been a popular destination for local school and youth groups, including Boy Scouts of America (BSA)-sponsored groups from southern Utah and adjacent areas of southern and eastern Nevada. Bloomington Cave is also regularly visited by groups from local churches and social organizations. Among local residents, a visit to Bloomington Cave has long been a "rite of passage" for young people. Cave enthusiasts, who are often members of local and regional grottos, comprise a relatively small percentage of the total visitation at Bloomington Cave.

Based on data collected by BLM, the highest levels of visitation to Bloomington Cave occur in March, typically during "Spring Break" periods when schools of all levels are not in session. Other periods of high visitor use are in late May, when schools are dismissed for the summer, and during the early winter months. Data on visitation to Bloomington Cave is provided in Appendix B.

Recreational visits to Bloomington Cave are usually day use only, although the cave is also the location for social gatherings by some local youths, who use the cave as the setting for under-age drinking, overnight camping, and other activities. Overnight camping is particularly popular in the "Sand Box", an area at the bottom of the cave. Fire rings, trash, spray paint, graffiti, and human waste remain as evidence of this activity. Visitors also camp near the cave entrances, in the de-facto parking area that has developed over time from recreational use. The parking area is often littered with broken bottle glass, trash, and fire rings.

Visitor Safety
Groups of 20-30 visitors of all ages and physical fitness levels are regularly observed exploring Bloomington Cave, particularly on weekends and holidays. These large groups rarely have even basic cave safety equipment, such as reliable light sources, protective head gear, appropriate clothing and footwear. Many have never explored a cave and are unaware of the safety hazards associated with this activity.

In 1952, the local Dixie Grotto, assisted by members of the Southern California Grotto, evaluated Bloomington Cave as being too dangerous for continued, and often

unsupervised, visitation by school and youth groups. They noted that between July and November, 1952 "several hundred tons" of rock had fallen in the cave, burying "virtually miles of binder twine" that cave visitors were using to mark routes (*Washington County News*, page 1 article published on Jan.1, 1953). Grotto members informed the Washington County Commissioners about the hazards associated with visiting Bloomington Cave and presented a plan to blast the entrance to the cave closed to protect public safety.

> *The County Commissioners agreed that the Cave was a hazard and also agreed to furnish powder and a powder man for the purpose of closing the Cave permanently. Closure was effected on Jan. 2, 1953.*
>
> *Except for a few of the younger generation who felt that their playhouse had been destroyed, public reaction to the closure was very favorable. In fact, a definite sigh of relief went up from all local parents. The Grotto received the thanks of the St. George Chamber of Commerce and also received an approving editorial in the local newspaper* (*Utah Speleologist*, Feb. 1953, published by the Dixie Grotto).

This closure effort was only temporarily successful, as local youths quickly removed the rock rubble from the cave entrance and re-gained access to the cave. The Dixie Grotto made a second, unsuccessful attempt at closing Bloomington Cave to public access in 1954.

In recent years, a number of incidences involving large groups of visitors to Bloomington Cave have required Search and Rescue (SAR) emergency rescues of injured visitors. For example, in the summer of 2002, a member of a Boy Scout troop that was exploring the cave had to be rescued after breaking his leg in a fall near the cave's Big Room. That same year, at midnight on Christmas Eve (Dec.24, 2002), a teenager fell more than 150 feet to her death, while visiting Bloomington Cave with 15 other students and 5 adults**.** **Figure 4** shows a Washington County SAR team conducting an emergency rescue at Bloomington Cave in 2002.

Current Conditions

The St. George Field Office provides information to the public, when requested, about Bloomington Cave through its Public Information Room, but has no brochures, maps, or other information that direct visitors to the cave. Most visitors learn about the cave from others who have explored the cave or through organized trips, such those sponsored by BSA or local churches. Road access to Bloomington Cave is predominantly by county-maintained dirt roads. These roads can be muddy or impassable during the winter months and during the summer monsoon season. No road signing directs visitors to the turn-off from the road to Bloomington Cave.

A small vehicle parking area has developed through visitor use near the cave entrances and user-created footpaths lead to the north and south entrances. In 2005, BLM installed a temporary wooden kiosk in the parking area and posted a map of Bloomington Cave, as well as information about main routes through the cave, cave safety, and cave "etiquette" on the kiosk. The public information materials were all prepared and donated by volunteers. The temporary kiosk was damaged by a wild fire in 2006 and finally destroyed by vandals in 2008. Volunteers replaced the temporary kiosk shortly thereafter and continue to assist BLM in monitoring visitor uses and conditions at Bloomington Cave. Volunteer cave enthusiasts also assisted BLM by flagging the main routes through the cave, to lessen the need for visitors to create their own route markings. Resource conditions within the cave are also monitored by BLM cave specialists who work for the Arizona Strip

Figure 4 View of Washington County SAR emergency rescue at Bloomington Cave in 2002.

District Office and the Grand Canyon-Parashant National Monument, as the St. George Field Office has no cave specialists on its staff.

A visitor register, hanging in the Big Room, has collected eight years of visitor use data. Between April 10, 2000 and February 18, 2006, for example, the data indicated an average of 650 visitors annually entered the Big Room of Bloomington Cave. A cave data-logger was placed in the Big Room, below the Visitor Register, in June of 2008. Data collected by this counter estimates that more than 900 visitors enter the Big Room on an annual basis. A second data-logger was placed in the parking area and data collected from this counter estimates that more than a 1,000 vehicles enter the area annually. Detailed visitor use data for Bloomington Cave between 2000 and 2009 is posted at the following website and in Appendix B: http://www.cave.org/grotto/timpgrotto/BloomingtonStats3.html.

Management Issues and Opportunities

The following issues at Bloomington Cave were identified by the public and BLM staff during scoping and preparation of this management plan: Opportunities for management actions to resolve resource issues and conflicts are also shown here.

Biological Resource Issues

Systematic inventories of cave life forms have not been conducted and baseline biological data is lacking to assist in making informed resource management decisions. Fewer Townsend's big-eared bats and other bat species are present in Bloomington Cave.

Uncontrolled visitation (e.g., large group sizes, campfires) may have contributed to the abandonment of cave by bats.

Management Opportunities

- Conduct systematic biological inventories to identify cave biological resources;
- Install bat counters, if warranted;
- Monitor bat populations to determine species present and habitat conditions;
- Restore quality of bat habitat;
- Install bat-friendly locking gates;
- Manage visitation through a permit system;
- Reduce group sizes and group numbers;
- Using monitoring data, manage visitation to reduce impacts on bat populations and habitat;
- Provide interpretive and public education materials about cave life.

Geological Resource Issues

Mapping of cave passages has not been completed;
Spray painting of formations continues to degrade visitor experiences;
Cave restoration work is still needed

Management Opportunities

- Continue mapping of Bloomington Cave, in partnership with NSS, regional grottos, and other qualified volunteers
- Use cave mapping to inventory existing graffiti, vandalism to cave formations;
- Increase public awareness of appropriate cave etiquette through use of visitor permitting system;
- Manage visitor group sizes, to lessen impacts created by large groups;
- Monitor resource conditions at regular intervals;
- Support volunteer projects for cave restoration

Cultural/Historical Resource Issues

Systematic inventories of cultural resources have not been conducted;
Damage to earlier inscriptions would destroy or degrade historic or educational value of these resources.

Management Opportunities

- Conduct systematic archeological inventories of the cave;
- Professionally record historic inscriptions and evaluate these and any other cultural resources documented for inclusion to the National Register of Historic Places;
- Identify and clearly mark main routes within cave to prevent further damage;
- Increase public awareness of appropriate cave etiquette.

Visitor Use Issues

Quality of visitor experience at Bloomington Cave has been degraded by cave resource damage related to inappropriate visitor activities;
Visitor safety is impacted by group sizes, lack of appropriate basic cave safety equipment and limited understanding of cave hazards;
Public lacks information that would create appreciation of cave resources and cave etiquette

Management Opportunities

- Manage visitation through a permit system;
- Provide cave safety, risk assessment information through permit system;
- Reduce group sizes and group numbers;
- Provide interpretive and public education materials;
- Restore cave resource conditions;

- Monitor resource conditions and quality of visitor experiences.

Research Issues
Research protocols have not been developed to ensure that all studies are conducted in a manner does not impact cave values and life forms.

Management Opportunities
- Identify protocols for evaluating and issuing research permits for Bloomington Cave;
- Identify research needs to help in the management of the cave;
- Establish partnerships and funding opportunities to conduct appropriate research projects

Monitoring Issues
Monitoring of cave resources has not been conducted on a regular basis.

Management Opportunities
- Identify monitoring needs;
- Establish baseline data;
- Develop monitoring protocols and schedules for cave resources;
- Identify St. George Field Office contact for all volunteer and staff activities at Bloomington Cave;

Public Participation in the Planning Process
This Plan has been developed with the participation and assistance of interested members of the public and an interdisciplinary team of resource professionals from the St. George Field Office, and cave specialists from the Arizona Strip Field Office of BLM and the National Park Service, Grand Canyon-Parashant National Monument.

In 2003, members of several Utah grottos contacted the SGFO to express concerns about increasing resource damage at Bloomington Cave and the need for increased management of visitor uses at the cave. Following that contact, the St. George Field Office staff informally sought input from cave enthusiasts and federal agency cave specialists to identify management actions needed to lessen resource impacts, improve the quality of visitor experiences, and protect public safety. Public scoping for a proposed cave management plan and an Environmental Assessment (EA) was initiated in 2006, with a notification posting on the Utah-BLM's web-based Environmental Notification Bulletin Board (ENBB) and in the Public Room of the St. George Field Office on June 23, 2006. A BLM point of contact was identified in the ENBB and Public Room postings and the public invited to identify issues related to the proposed management plan/EA. No written comments were received as a result of this posting, although cave visitors and grotto members have verbally expressed support for management actions that would lessen the impacts of spray-painting and graffiti on the cave.

Information programs about the Bloomington Cave Graffiti Removal project were presented by BLM cave specialists at the National Speleological Society (NSS) Convention and the National Cave Management Symposium in 2005 and in public outreach programs to local BSA troops and the public. These programs included public notification that BLM was drafting a Plan/EA for Bloomington Cave and invited the public to provide input to the SGFO. The Washington County Commissioners were briefed in October of 2008 about BLM's proposal to manage public access through a permit system. A public review and period was provided on the draft Plan/EA, ending on Feb. 25, 2009; eight written comments were received and revisions made to the Plan/EA based on substantive public comments.

CHAPTER 2
MANAGEMENT DIRECTION, OBJECTIVES AND PLANNED ACTIONS

RMP Management Direction
The Bureau of Land Management's mission is to

> *sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.*

BLM goals for the management of recreation on public lands include ensuring quality recreational experiences, enjoyment of natural and cultural resources, and providing for and receiving fair value in recreation.

Land Use Plan Direction

Recreation Management
Management direction from the St. George Field Office RMP under Recreation Management states

> *Bloomington Cave will be monitored periodically and appropriate guidelines implemented to provide for visitor safety and the protection of cave resources (RMP 1999, Decision RC-17 c).*

Other applicable directions from the RMP include the following:

Special Status Species
The RMP (1999: p. 2.25, through stated Management Objectives for Special Status Species commits to directing special attention to those animals listed as "sensitive" under the Utah Sensitive Species List and the management of habitat for these species so as to avoid the need for future listing under the Endangered Species Act. Decision FW-11 states that where discretionary land uses are degrading habitats for sensitive species, BLM will "implement changes" to that discretionary land use to resolve the resource conflicts.

Visual Resources Management (VRM)
Management actions at the Bloomington Cave site must comply with the VRM Class III designation for the area, in accordance with the St. George RMP, as amended (1999). The objective for VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. All changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Management actions at the Bloomington Cave site will at all times attempt to blend with the natural landscape and maintain the natural setting of the area. As much as possible, management will pursue a minimalist approach to the development of facilities necessary to achieve goals and objectives.

Management Objectives and Planned Actions

The following objectives and planned actions are proposed to address identified resource issues and resolve resource conflicts

Biological Resources-Significance Criterion for Bloomington Cave

Objective*: *Effectively protect and manage sensitive bat species and habitat at Bloomington Cave.

Management Action: BLM will inventory bat populations and habitat quality at Bloomington Cave, working in collaboration with U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, NSS, academic institutions, or others with specialized knowledge and expertise.

Management Action: BLM will monitor bat populations to more accurately determine bat migration and usage seasons at Bloomington Cave and to assess any impacts from recreational use at levels identified in this Plan. Bat monitoring will be conducted by trained wildlife biologists. If monitoring data warrants, BLM will modify visitor use regulations or implement seasonal or area closures at Bloomington Cave to ensure effective protection for sensitive bat populations. Monitoring will be conducted according to protocols developed in collaboration with U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, academic institutions, or others with specialized knowledge and expertise

Management Action: BLM will install and maintain locking bat-friendly gates at the north and south entrances of Bloomington Cave to protect the critical "twilight zone" of bat habitat. Gates will be constructed in compliance with American Cave Conservation Association and Bat Conservation Institute designs and standards. The gates will remain locked at all times, with public access authorized only through a Special Recreation Use Permit (SRPs) to be obtained from the St. George Field Office. Only authorized access will be allowed to the cave. Regular monitoring and maintenance will be performed on the gates to ensure proper function.

Management Action: BLM will monitor any effects to cave temperature or wind effects created by installation of the cave gates. Temperatures will also be monitored at cave locations that would represent ideal roosting locations for bats.

Management Action: No fires, including campfires or other burning, will be authorized within the cave.

Management Action: No overnight camping will be authorized within Bloomington Cave or within a ¼ mile radius of the cave.

Management Action: If monitoring data indicate that visitor uses under this Plan are negatively impacting bat species (populations and critical habitats) that are federally-listed under the Endangered Species Act or listed as sensitive species by the State of Utah, BLM will modify the stipulations of the visitor use permits, implement seasonal or area closures, or develop other mitigation measures to address the impacts.

Objective*: *Inventory, protect and manage other biological resources at Bloomington Cave.

Management Action: BLM will authorize, coordinate, and support systematic inventories of all cave life forms in Bloomington Cave, to determine what other biologic resources may or may not exist at the cave.

Management Action: BLM will monitor populations and habitats of other cave life of forms on a regular basis to more accurately determine habitat needs and population trends.

Management Action: BLM will adaptively manage visitor use, modifying the stipulations of the SRPs, implementing seasonal closures,

or developing other mitigation measures to address the impacts, if monitoring data indicate that visitor uses under this Plan are negatively impacting sensitive cave life populations and habitats.

Management Action: BLM will take actions to restore the quality of biological habitats, through visitor use management and project-specific actions, such as the removal of string and other litter.

Geologic Resources

Objective*: *Protect geologic formations in Bloomington Cave.

Management Action: BLM will authorize, coordinate, and support, as necessary, continued mapping of the cave and systematic inventories.

Management Action: BLM will monitor the cave's geologic formations for evidence of new defacement (e.g., spray painting, "Glo Sticks", chalk), mineral mining, theft, and littering to more accurately determine law enforcement needs, permitting changes, and restoration needs to protect these resources.

Management Action: BLM will authorize and seek support for studies on the cave's tectonic development and history, including studies of seismic activity potential that could threaten visitor safety. BLM will authorize the placement of seismic data collection instruments within the cave.

Cultural/Historical Resources

Objective*: *Inventory, protect and manage archeological resources of Bloomington Cave.

Management Action: BLM will authorize, coordinate, and seek support for systematic professional archeological inventories of Bloomington Cave and the documentation and evaluation for listing to the National Register of Historic Resources of all identified cultural resources within the cave.

Management Action: BLM will monitor condition of the historic inscriptions or other identified cultural resources within Bloomington Cave on a regular basis to assess any impacts from continued visitor use at levels identified in this Plan. Removing, defacing, or altering any of the historical signatures or adding new signatures to the walls of the cave will be strictly prohibited. Digging and the removal any prehistoric or historic period artifacts will also be strictly prohibited. Suspected violations will be thoroughly investigated by BLM law enforcement.

Visitor Use [Recreation Significance Criterion for Bloomington Cave]

Objective*: *Provide for prepared and quality visitor experiences by managing visitor use through a permit system.

Management Action: BLM will implement a visitor permit system to manage public access and recreational use of Bloomington Cave. Permits (SRPs) will be issued by the St. George Field Office on a first-come, first-serve basis. **No fees will be charged for Bloomington Cave SRP permits at this time.** (Refer to Appendix A for example of permit forms.)

Management Action: BLM will limit group size to a **maximum** of 10 persons per group, including group leaders. For all groups, leaders must be at least 21years old, have adequate caving experience; and be knowledgeable of established cave safety practices and cave conservation measures.

Management Action: BLM will require that each group have a **minimum** of 3 persons per group. For all groups, leaders must be at least 21years old, have adequate caving experience; and be knowledgeable of established cave safety practices and cave conservation measures.

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Management Action: BLM will limit the SRPs issued for Bloomington Cave to 3 permits per day. Permits will be issued for specific entry times, to allow a minimum of two hours of spacing between groups. Permits will be issued on a first come, first served basis. If needed, a permit reservation system will be established to expedite the permit application process.

Limits on the number of daily permits issued may be changed in the future by BLM, based on monitoring of the quality of visitor experiences and cave resource conditions.

Management Action: BLM will require that Boy Scout leaders apply for and obtain an SRP and provide a copy of an approved BSA tour permit. As required by BSA caving policy, BSA-sponsored caving groups must have two group leaders present during the cave visit, one of whom must be at least 21years old. Leaders must have adequate caving experience; and be knowledgeable of established cave safety practices and cave conservation measures. All BSA-sponsored trips will adhere to the SRP permit stipulations, including group size limits and the use of appropriate cave safety equipment.

Management Action: BLM will require that BSA-sponsored caving groups have a **Minimum** of 5 persons per group, two of whom must be qualified group leaders (21years old, adequate caving experience; knowledgeable of established cave safety practices and cave conservation measures). All BSA-sponsored groups will adhere to all SRP stipulations.

Management Action: BLM will require the use of appropriate cave safety equipment by all visitors to Bloomington Cave. Each person will wear a safety helmet (hard hat) with chin strap at all times while in the cave and have in their possession at least three sources of light, one of which will be attached to the helmet. Candles, matches and cigarette lighters are not acceptable as second light sources**.**

Management Action: BLM will request that a Post-Trip Use Report be filed by all groups within 72 hours after visiting Bloomington Cave.

Management Action: BLM will deny subsequent applications for permits to individuals or groups that failure to comply with permit stipulations.

Management Action: BLM will not authorize overnight camping within Bloomington Cave or within a ¼ mile radius of the cave.

Management Action: BLM will not authorize any fires, including campfires or other burning, within Bloomington Cave or within a ¼ mile radius of the cave.

Management Action: BLM will not authorize the disposal of litter, food products, or solid human waste within Bloomington Cave.

Management Action: BLM will not authorize route marking of any type and/or any other marking or defacement of the walls, ceilings, and floors of Bloomington Cave.

Management Action: BLM will not authorize damage to or removal of geological formations in Bloomington Cave.

Management Action: BLM will ensure that cave maps, information, and easily identifiable route marking are available to lessen the potential for damage from visitor uses.

Management Action: BLM will install directional road signing to Bloomington Cave and install fencing to delineate the boundaries of the parking area.

Management Action: BLM will require that all vehicles park in the designated parking area at Bloomington Cave.

Management Action: BLM will require that all vehicle travel, including OHVs, in the vicinity of Bloomington Cave be limited to existing roads.

Objective: Provide effective management of emergency rescues at Bloomington Cave.

Management Action: BLM will prepare and update an SAR Plan for Bloomington Cave and make copies of that plan available to all cooperating entities, to improve rescue operations coordination actions between BLM Law Enforcement Rangers, the Washington County Sheriff's Department, and Washington County Search and Rescue Teams.

Management Action**:** BLM will authorize, coordinate, and participate in SAR training exercises at Bloomington Cave, as needed. Special authorization from BLM will be needed for SAR training operations in Bloomington Cave.

Objective: Protect sensitive cave resources during emergency rescues at Bloomington Cave.

Management Action: BLM will not authorize the use of drilling, bolts, or other cave modifications, except when absolutely necessary to safely extract injured visitors during SAR emergency rescues.

Management Action: BLM will assess any damages to cave resources that result from SAR emergency response and develop recommendations for rehabilitation or mitigation.

Research

Objective: Encourage, coordinate, and support scientific research at Bloomington Cave

Management Action: BLM will issue administrative permits to conduct research and data collection projects. Projects will be evaluated against established BLM Guidelines for Cave Research and cave-specific research protocols.

Management Action: BLM will conduct, authorize, and seek support for paleo-environmental and paleo-climatic research, including paleo-pollen studies of buried deposits within Bloomington Cave.

Restoration

Objective: Conduct cave restoration projects at Bloomington Cave

Management Action: BLM will authorize and seek support for volunteer cave restoration projects. Participants in such projects will sign Volunteer Agreements with BLM and will be under the direct supervision of a BLM cave specialists or volunteers who have caving qualifications that meet BLM Cave Safety Standards. Group size limits may be waived during such projects to allow restoration activities to be conducted quickly and efficiently

Monitoring

Objective: Utilize regular monitoring of Bloomington Cave to minimize or mitigate any resource impacts from visitor uses.

Management Action: BLM will conduct monitoring visits and condition assessments at Bloomington Cave. Monitoring will focus on resource values and recording evidence of new resource damage. Photo monitoring may be utilized to assist monitoring efforts. If impacts to important resource values are observed to be reaching critical thresholds, BLM may take steps to mitigate these impacts, such as those described above under Visitor Uses.

List of Acronyms

BLM	Bureau of Land Management
BSA	Boy Scouts of America
CFR	Code of Federal Regulations
FCRPA	Federal Cave Resources Protection Act of 1988
LNT	Leave No Trace
NEPA	National Environmental Policy Act
NSS	National Speleological Society
OHV	Off-Highway Vehicle
RMP	Resource Management Plan
ROS	Recreation Opportunity Spectrum
RUP	Recreation Use Permit
SAR	Search and Rescue
VRM	Visual Resources Management

References

Boy Scouts of America General Caving Policy http://www.scouting.org

Bureau of Land Management (2001). *Special Status Species Policy, BLM Manual 6840*.

CFR 43, Part 37.11 (c), Significant Cave Criteria.

*Federal Caves Resources Protection Ac*t of 1988 (16 U.S.C. 4301-4309).

Federal Land Policy and Management Act, 1976 (FLPMA) (Section 103).

Middaugh, Jeff 1976 Unpublished BLM staff report of visit to Bloomington Cave, copy on file SGFO, St. George, UT.

The Spectrum, St.George Feb. 6, 2005, feature article, page 1.

USDI-BLM (2005). *Bureau of Land Management Cave Safety Standards*. Washington, DC: BLM Washington Office, Instruction Memorandum No. 2005-095, Change 1

USDI-BLM (1999). *St. George Field Office Record of Decision and Resource Management Plan*.

Utah Caver Annual, 2005, 2007 *Annual Publication of the Utah Grottos*.
http://www.jonjasper.com/UtahCaverAnnuals/UtahCaverAnnual2005.pdf.
http://www.jonjasper.com/UtahCaverAnnuals/UtahCaverAnnual2007.pdf.

Washington County News, St. George, Jan 1, 1952, article page 1

Appendix A

EXAMPLES OF SRP PERMIT FORMS

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ST. GEORGE FIELD OFFICE
345 EAST RIVERSIDE DRIVE
ST.GEORGE, UT 84790
Phone: (435) 688-3200
Fax: (435) 688-3254

APPLICATION FOR BLOOMINGTON CAVE ENTRANCE PERMIT

Including Group Leader, Maximum Group Size is Ten (10) Persons,
Minimum Group Size is Three (3) Persons*

Permit Requirements:
Each group must have a Group Leader who is at least 21years old, has adequate caving experience; and is knowledgeable of established cave safety practices and cave conservation measures.

Each person in the caving party will wear a safety helmet (hard hat) with chin strap at all times while in the cave and have in their possession at least three sources of light, one of which will be attached to the helmet. Candles, matches and cigarette lighters are not acceptable as second light sources.

***Boy Scouts of America (BSA)-sponsored groups must have a minimum number of 5 persons per group, with two Group Leaders, one of whom must be at least 21years old. The Group Leaders must have adequate caving experience and be knowledgeable of established safety practices and cave conservation measures. Boy Scout leaders must apply for and obtain an SRP and provide BLM a copy of their BSA-approved tour permit.**

****

A. Intended Use Date _____ 2nd Choice _____ 3rd Choice _____

B. Person(s) to Contact in Case of an Emergency:

_____

_____
Name, Address, Day and Evening Phone Numbers with Area Code

C. Group Leader _____ Age _____

D. Names, Addresses, Phone Numbers Of All Members of the Group:

2._____ _____

3._____ _____

4._____ _____

5._____ _____

6._____ _____

7._____ _____

8._____ _____

9._____ _____

E. Optional Medical Information: (Name and condition, i.e. disability, asthma, diabetes, allergies, medications)

1._____
2. _____
3._____
4._____
5._____
6. _____
7._____
8. _____
9._____
10. _____

F. Purpose of Visit: Recreation __ Geology__ Photography __ Education __ Research
Other:_____

G. Parental or Legal Guardian Consent:
The consent of a parent or legal guardian is required for all individuals under 18 years of age who will not be accompanied on the proposed cave trip by their parent or legal guardian.

As part of the application to enter the cave(s) administered by BLM, I consent to allow my child to participate in the proposed cave trip. The trip leader named on this application form is delegated the responsibility for the care and instruction of my child while he or she is in the cave(s). By my signature on this form. I also agree on behalf of my child to be bound by the permit General Conditions and any Special Stipulations that will apply to authorization for the cave visit.

CHILD'S NAME AND AGE (PRINT)	SIGNATURE OF PARENT OR LEGAL GUARDIAN
1._____	_____
2._____	_____
3._____	_____
4._____	_____
5._____	_____

United States Department of the Interior

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Fax: (435) 688-3254

SPECIAL RECREATION USE PERMIT
BLOOMINGTON CAVE, WASHINGTON COUNTY, UTAH

PERMIT. NO._____ USE DATE:_____

Permission is hereby granted to _____ and a party of up to _____ other people as reflected by signatures below to enter the above named cave(s), located on public lands. Authorized by:

_____ Date _____ Lock Combination:_____

Please return the lock numbers to 0000

The following signatures indicate that Permittees have received and understand information provided by the BLM on risk awareness in the cave, and agree to comply with the general conditions, attached Special Stipulations, and Cave Safety Checklist for this authorization:

1._____ 6._____

2._____ 7._____

3._____ 8_____

4._____ 9._____

5._____ 10._____

IN CASE OF EMERGENCY, DIAL 911

GENERAL REQUIREMENTS:

1. This permit neither authorizes nor implies permission for the intentional or unintentional damage or removal of cave resources, such as: archaeological and historical artifacts, natural materials or features, plant and animal life, or any item of public property. Violations of federal or state laws, general conditions or special stipulations are punishable, upon conviction, by fines up to $100,000.00, or imprisonment not to exceed one year, or both (Federal Cave Resources protection Act of 1988, 43 CFR 8364.1, 43 CFR 8360.0-7).

2. This authorization is validated only upon signature of the Permittees, and is valid only for those individuals whose signatures appear hereon.

3. Each person in the caving party will wear a safety helmet (hard hat) with chin strap at all times while in the cave(s) and have in their possession at least three sources of light, one of which will be attached to the helmet. Candles, matches and cigarette lighters are not acceptable as second light sources.

4. This authorization is issued only for the time period specified on the face of this permit. It is revocable for any breach of conditions hereof, or at the discretion of the Authorized Officer of the Bureau of Land Management at any time upon notice.

5. Permittees shall exercise diligence in protection from damage of the land and property of the United States covered by this authorization, and shall pay the United States for any damage resulting from negligence or from the violation of the terms of this authorization or of any law or regulations applicable to public lands.

6. Permittees agree as a condition precedent to the issuance of this authorization, to indemnify, defend, and hold harmless the United States and/or its agencies and representatives against and from any and all demands, claims, or liabilities or every nature whatsoever including, but not limited to, damages to property, injuries to or death of persons arising directly or indirectly from or connected in any way with the use and occupancy of the lands and cave(s) described on this authorization.

7. Overnight Camping is not permitted within Bloomington Cave nor within a ¼ mile radius of the gated entrances to the cave.

8. No Fires, including campfires or other burning, are permitted within Bloomington Cave or within a ¼ mile radius of the gated entrances to the cave.

9. No litter is to be left within Bloomington Cave or elsewhere on public lands.

10. No solid human waste is to be deposited in Bloomington Cave.

11. No route marking and/or other marking or defacement of the cave walls, ceilings, or floors is permitted.

12. No damage to or removal of cave geological formations is permitted.

13. All vehicle parking must be within the designated parking area at Bloomington Cave.

14. All motorized vehicle travel, including OHVs, is limited to existing roads.

15. The gate lock is to be secured while permittees are in the cave (secure the lock but don't lock yourself in) and before you depart from the cave area. You must determine there are no other people still in the cave before locking the gate. Mechanical problems with locks will be promptly reported to the authorizing officer.

16. **The gate combination lock must be returned to 0000 prior to leaving the cave.**

17. A completed Post-Use report is requested to be returned to the St. George Field Office within 72 hours.

RISK AWARENESS

All undeveloped caves, by their very nature, contain some safety risks. When you go caving, you do so of free will and at your own risk. Make your trip a safe and enjoyable one by being prepared and careful. Most caves contain some risks that are common to the underground environment, such as loose rocks,

low ceilings, tight passages, slippery surfaces, standing water, and unstable or uneven floors. Be prepared by wearing the proper clothes and carrying the proper equipment, following safety hints, staying within your group's capabilities, keeping your group together, and using common sense.

Specific safety issues described below may be encountered at any time in Bloomington Cave, but additional risks due to natural causes could have occurred since the last time the cave was visited.

- Cave surfaces can be slick and slippery. Areas of dripping water and mud may be encountered. Risk of falling and serious injury exists in Bloomington Cave. **Proceed with caution at all times. Do not go into an area you are not sure you can safely exit.**

- Parts of the cave consist of small crawlways and squeeze ways. Narrow, turning passageways can cause confusion and loss of orientation.

- Cavers should be aware of the risk of exposure to Hantavirus and Giardia. Avoid areas of rodent concentration or bat roosts. Use a dust mask or respirator for best protection

SPECIAL STIPULATIONS

1. This permit is not transferable without prior approval of the issuing office.
2. **The maximum group size allowed inside the cave *at any one time* is limited to 10 persons**, including the group leader who must be an adult, at least 21 years of age.
3. Whenever possible, stay on previously traveled routes while inside the cave. **Do not tread on or touch delicate geological formations in the cave, especially on the walls or ceilings.**
4. All equipment or material taken into the cave by visitors must be removed at the end of each cave visit.
5. **Leaving human waste or toilet paper behind in the cave is prohibited.** Take along a plastic bottle or disposal bag if you must urinate or defecate inside the cave.
6. Smoking, overnight camping, pets, firearms, open fires, and gas or propane lanterns are prohibited inside the cave.
7. **You may NOT disturb, or remove any geological formations, kill or harass cave life forms, or damage cultural resources in the cave.** Everything in the cave is protected by Federal law. Suspected violations will be investigated and prosecuted.
8. Avoid contact with bats; keep lights away from bats; **DO NOT INTENTIONALLY ANNOY OR DISTURB BATS AT ANY TIME.**
9. Do not alter or remove any of the historic inscriptions and/or dates visible on the walls of the cave.
10. Do not write, paint, carve, or otherwise leave markings on the cave walls, ceilings, or floors.
11. Do not remove, relocate, or tamper with any scientific instruments or devices that you may encounter inside the cave.
12. ***Group leaders will not disclose the lock combinations, except in emergency situations.***

_____ _____

Signature of Permittee/Group Leader Date

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
ST. GEORGE FIELD OFFICE
345 EAST RIVERSIDE DRIVE
ST.GEORGE, UT 84790
Phone: (435) 688-3200
Fax: (435) 688-3254

CAVE SAFETY CHECKLIST
IN CASE OF EMERGENCY, CALL 911

Equipment:

___ Helmet or hardhat with sturdy chinstrap for all party members.
___ Electric headlamp on every helmet (so hands are free for crawling and climbing).
___ Two additional reliable sources of light (flashlight, glow sticks, etc.). Extra batteries and spare bulbs. Keep them within easy reach.
___ Climbing rope or length of webbing (at least 25 ft.) in good condition.
___ Cell phone or other emergency communication devices, GPS unit
___ Warm and/or waterproof clothing, such as coveralls or long-sleeve shirt & pants; leather gloves, and good boots with ankle support. Knee and elbow pads are also recommended.
___ Small backpack or gear bag.
___ Dust mask or handkerchief.
___ First aid kit & emergency "space" blanket.
___ Water and quick energy food.

Before you go:

___ Leave information about your plans, directions, emergency phone numbers with a responsible party.
___ Inspect and test all equipment before leaving.
___ Place your car's ignition keys in a safe location near your car before entering the cave.

Inside the cave:

___ Keep your group together to avoid disorientation or separation. Never go further into a cave than a point from which you can safely find your way out.
___ Proceed slowly and with caution. Monitor members of your party and exit the cave before anyone becomes too exhausted or stressed to continue.
___ Stay within your limits. Do not use ropes or cable ladders until you have been adequately trained for vertical-entry caving. Do not jump down climbs or over obstacles. Do not climb up or down passageways that you are not sure you can exit.
___ Beware of encounters with snakes, rodents, bats, insects, and other potential wildlife. Avoid areas of rodent (packrat) waste or bat roosts: exposure to Hantavirus and Giardia is possible.

United States Department of the Interior

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BLOOMINGTON CAVE POST-TRIP REPORT:

GROUP LEADER(S):_____
BLOOMINGTON CAVE PERMIT NO._____
USE DATE: _____

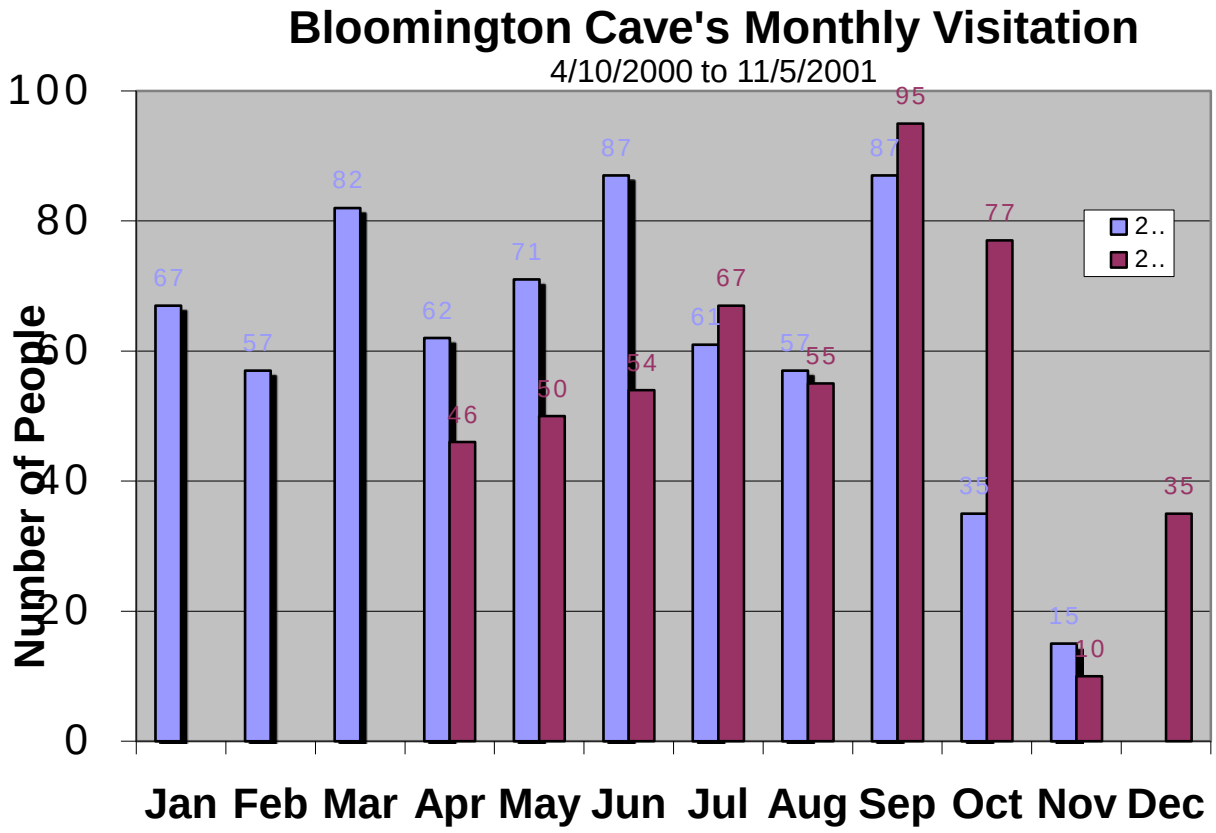
- Gate locked, combination numbers returned to 0000: YES____NO____
- Condition of Access Road, Signs, and Parking Area:
  _____
  _____
- Condition of Gate & Lock: _____
  _____
  _____
  _____
- Trash or debris found (please help us by removing it): _____
  _____
  _____
- Evidence of recent vandalism: _____
  _____
  _____
  _____
- Approx. # of Bats encountered:_____ Area(s) of cave: _____
  _____
  _____
- Injuries/accidents:_____
  _____
  _____
- Other issues/comments/concerns: _____
  _____
  _____
  _____
  _____
  _____

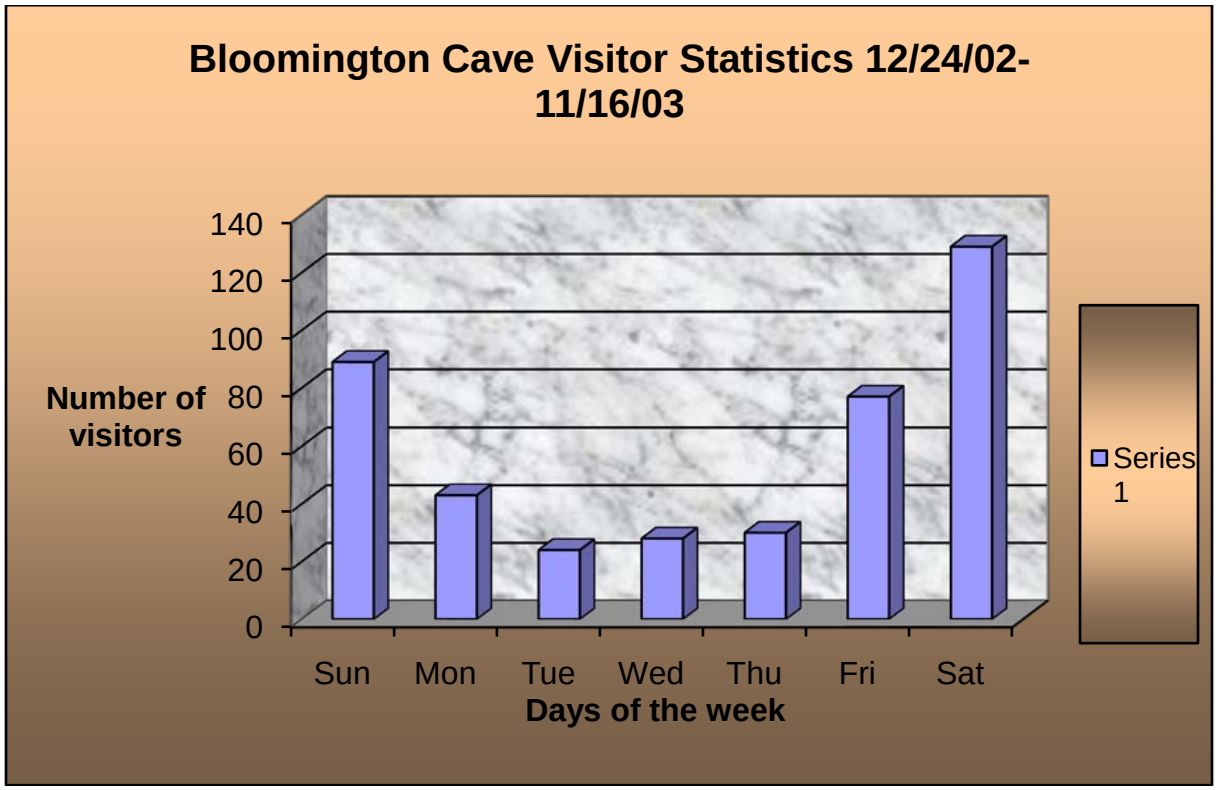
Group Leader's Signature:_____Date:_____

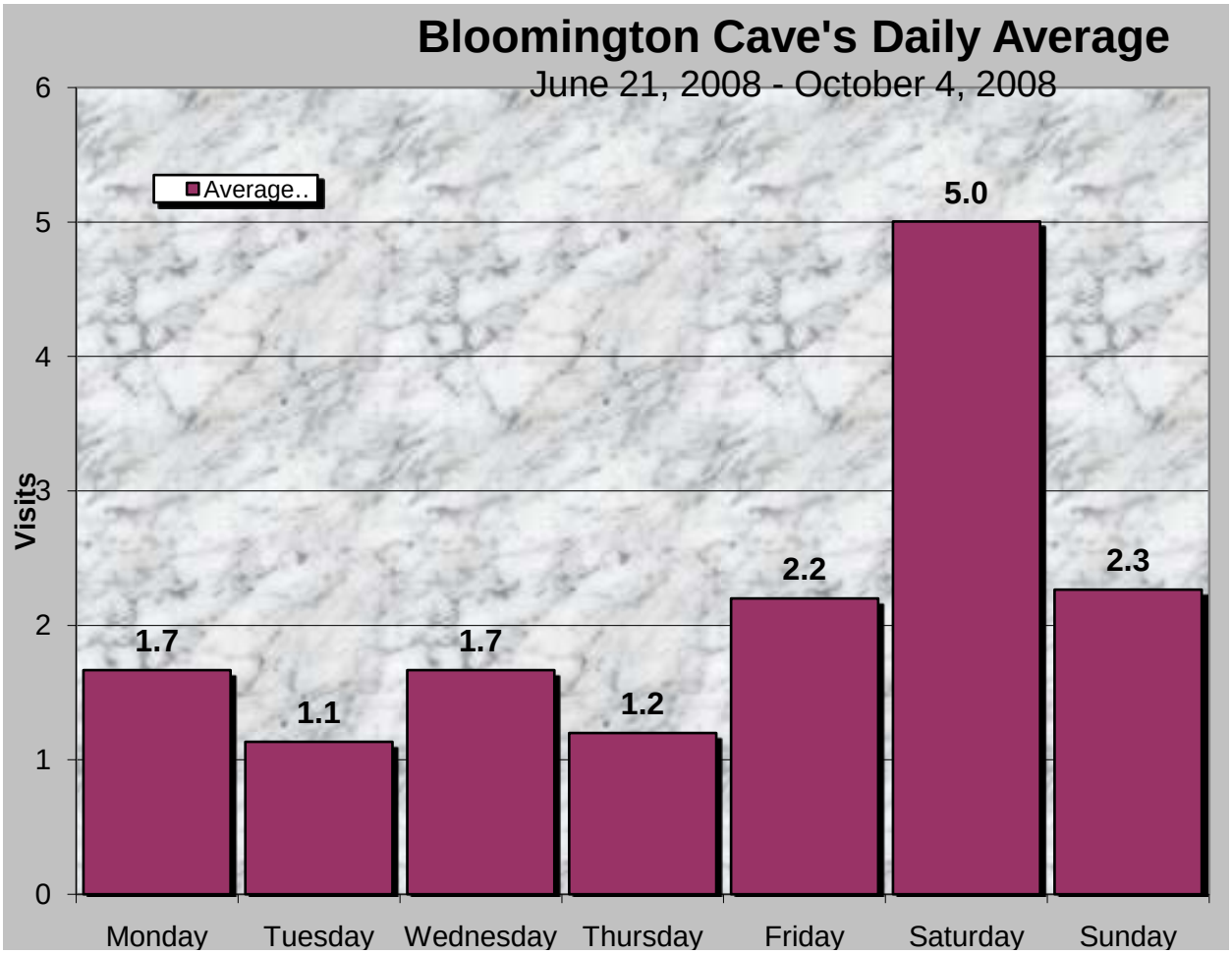
PLEASE COMPLETE AND RETURN THIS FORM WITHIN 72 HOURS AFTER THE CAVE TRIP. Thank you for your assistance and commitment to the conservation of public lands.

Appendix B

RECREATIONAL USE DATA
BLOOMINGTON CAVE


Bloomington Cave's Monthly Visitation
4/10/2000 to 11/5/2001
Number of People
100
80
60
40
20
0
67
57
82
62
46
71
50
87
54
61
67
57
55
87
95
35
77
15
10
35
2..
2..
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec


Bloomington Cave Visitor Statistics 12/24/02-11/16/03
Number of visitors
140
120
100
80
60
40
20
0
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Days of the week
Series 1


Bloomington Cave's Daily Average
June 21, 2008 - October 4, 2008
Average..
Visits
6
5
4
3
2
1
0
1.7
1.1
1.7
1.2
2.2
5.0
2.3
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

18.